



Information Technology

STRATEGIC PRIORITIES

FY2020 – FY2024

Year 2 Update



In this year 2 update, we renew our commitment to deliver strategic and innovative IT services to our UH community. For nearly two years the University endured unprecedented impact from COVID-19. The global pandemic required us to realign IT service delivery strategies to the University Goals of continuing our educational mission and delivering student services while following the Centers for Disease Control (CDC), federal, state, and local guidelines. Thanks to the budget increase received this year, we successfully achieved these goals by technologically supporting the sudden University need to transition to a virtual environment, increasing remote instruction for our faculty and students, and enabling our researchers and staff to work effectively from home. Strategic planning, effective resource management and collaboration with our UH community will continue to shape the way we deliver IT value.

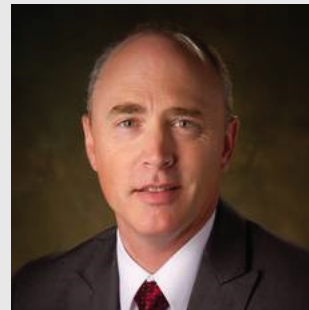
- Dr. Dennis Fouty

UNIVERSITY INFORMATION TECHNOLOGY

UIT ORGANIZATION



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Chief Information Officer



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STRATEGIC PRIORITIES

FY2020-FY2024 *Year 2 Update*

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MISSION, VISION, FOCUS

Mission and Overarching Goals

Our mission is to serve our University's colleges and administrative departments by focusing on three overarching goals:

1. Deliver a suite of highly reliable and secure technology services
2. Align with and serve our campus customers
3. Support state-of-the-art student, financial, human resources and other information systems

Vision

Create value across the UH System by investing in infrastructure capacity and security, collaborative tools and newer, more efficient and greener technologies to enable growth in services and protect revenue.

Strategic Focus

1. Create a reliable, secure, robust and cost-effective technology environment using industry best practices and technology
2. Maintain the high performance campus network infrastructure and a robust wireless footprint
3. Aggressively enhance security at the enterprise level and in customer environments
4. Actively pursue opportunities with UH business owners to leverage enterprise applications services and functionality

We endeavor to achieve these objectives by:

1. Engaging leadership in planning via our strategic priorities and our 10-year UIT Infrastructure forecast
2. Creating a federation of university IT providers
3. Developing and deploying UIT methodologies to the campus
4. Establishing UIT customer service assurance
5. Partnering with academic and administrative groups
6. Improving and streamlining our internal processes and structures
7. Increasing the credibility of UIT

OVERVIEW

Our IT Services and Summary of Operations

UIT provides IT services to the UH System and UH. We are responsible for the management of:

- The University's Communications Infrastructure and Telecommunication Services
- The UHS Data Center
- Information Technology Security
- Enterprise Systems and Services
- Campus Safety Systems
- Educational Technology Services (*General Purpose Classrooms*)
- Web Technologies and Applications
- IT Support Services (*including Helpdesk and the UH Contact Center*)
- Research Computing Services

The comprehensive list of services is available in our UIT Service Portfolio at <http://www.uh.edu/infotech/about/performance/service-management/>

In addition, we monitor the performance of our services daily. The table below is our 3-year Summary of Operations, which contains key performance indicators (KPIs) for major services.

UIT SUMMARY OF OPERATIONS FY2019-FY2021

SERVICES	FY19	FY21	% CHANGE
Enterprise Information Systems			
Finance Transactions	4,484,996	3,757,978	-16%
HR / Payroll Transactions	6,964,075	6,625,147	-5%
P-Card Transactions	76,626	46,367	-39%
Desktop Computing & User Support Services			
IT Support Center Service Requests	57,176	37,903	-34%
Network/Telecom Work Requests	1,656	1,226	-26%
Classroom Technology Equipment Requests	508	134	-74%
Classroom Technology Equipment Repairs	85	55	-35%
Enterprise Infrastructure and Services			
Email Accounts	23,466	88,457	277%
CougarNet Accounts	123,526	152,640	24%
Email Aliases	440,215	505,529	15%
Email Incoming Messages Processed	769,696,921	121,409,462	-84%
Information Technology Security			
UH Security Incidents	364	400	10%
Instructional Technology			
Blackboard Seats	126,598	179,707	42%
Blackboard Courses	3,262	3,172	-3%
Network Infrastructure and Security Services			
Active Data Ports	80,482	93,332	16%
Total Miles of Fiber Cable	2,290	2,900	27%
# Wi-Fi Access Points	5,517	6,324	15%
# Security Cameras	1,919	2,815	47%
Operations & Data Center			
Data Backup in Terabytes	8,491	11,695	38%
UNIX Servers, Logical Systems	358	273	-24%
Windows Servers, Logical Systems	486	490	1%
Web and Mobile Services			
UH Web Site Page Views	46,606,049	38,878,488	-17%
UH Go Screen Views	2,421,824	2,845,599	17%

IT PLANNING AND FINANCIAL CHALLENGES

During the first two years covered by these IT Strategic Priorities, higher education endured its greatest disruption in decades: the coronavirus and COVID-19.

Colleges and universities were forced to change the delivery model for learning in just days. Many operational processes were also affected. Abruptly, network operations, learning management systems, Teams, Zoom and personal computers became indispensable for all students and faculty. Thanks to years of careful, strategic IT planning, our infrastructure had been designed and maintained to be flexible, adaptable and scalable, and the University of Houston was better prepared than most of our peers.

Our annual desktop emergency response exercise routinely includes a pandemic scenario. We had the resilience and tenacity to meet the crisis head-on.

Strategy alone is insufficient to weather a crisis of this magnitude. Financial resources are also essential. Thanks to 12% additional funding over the last two years, we had the necessary support of the University to take quick, transformative action to enable fully remote education while maintaining a service level similar to that of our aspirational peer group, which includes Texas' largest public universities. When educational operations returned to campus, we were able to provide the technology needed to offer students the option to attend classes either fully online, face-to-face or online in a HyFlex model. The UH Go mobile app became indispensable for keeping faculty, staff and students connected and informed during both transitions.

Thanks to years of careful, strategic IT planning, our infrastructure had been designed and maintained to be flexible, adaptable and scalable, and the University of Houston was better prepared than most of our peers.

However, the enhancements brought by this one-time funding boost must have ongoing financial support to be sustainable, which they must if we are to achieve our goal to be a Top 50 Public University.

Peer Benchmarks: Percentage of IT Budget Spent

	RUN	GROW	TRANSFORM
UH	87%	9%	4%
TAMU	78%	12%	10%
UT-DALLAS	92%	7%	1%

Source: Core Data Survey 2020, Educause

SHARED IT GOVERNANCE AND SHARED SERVICES

IT services provided to the UH community are guided by shared IT governance. The University has 15 colleges and five divisions, each with a distributed IT organization. The management of each is responsible for administering and protecting its IT resources. Through the Technology Partners Program (TPP), UIT collaborates with colleges and divisions to develop procedures and establish internal controls for IT resources in the following areas: **Risk Management, Resource Security, Project Management, Resource Management, Service Continuity Management.**

As part of shared IT governance, there are three policy roles defined in MAPP 10.03.06:

- **College/Division Information Resource Manager (C/D-IRM):** The most senior administrator who is responsible for managing the college or division's information resources,
- **College/Division Technology Manager (C/D-TM):** An IT professional who is responsible for managing the college or division's daily information technology operations and projects, and
- **College/Division Information Security Officer (C/D-ISO):** An IT professional, usually reporting directly to the IRM, responsible for managing the college or division's information security functions in accordance with the established policies and guidelines.

IT decision-making is a collaboration among the UH senior executive team, business owners, Student Senate, Faculty Senate and other key governance groups.

UIT offers the Technology Review program (CTR) to UHS campuses and UH units. The CTR is a comprehensive assessment that enables us to collaborate and understand the unit's IT operations, recommend industry best practices and promote shared services. Shared services have repeatedly produced substantial savings, enabling coordinated and efficient service delivery. They achieve economies of scale and free our Technology Partners to invest their resources in delivering local support and specialized services.

BUILDING OUR FUTURE: THE STRATEGIC PLANNING PROCESS

UIT began assembling these Strategic Priorities in May 2019. We examined the latest IT trends in higher education alongside the goals of the University and proposed 11 priority areas. Then, we surveyed faculty, staff and students to rank these and propose any additions for consideration. Over 130 participants contributed to these Strategic Priorities. The results of the survey are shown below:

RANK	STRATEGIC PRIORITY	SCORE	RANK	STRATEGIC PRIORITY	SCORE
1	Information Security	2.80	6	Shared Services	2.52
2	Continuity of Operations	2.76	7	Mobile Technologies: UH Go	2.39
3	Network Connectivity	2.75	8	Blended Data Center	2.38
4	Collaboration and Unified Communications	2.59	9	Academic Technologies	2.36
5	Data Management and Analytics	2.54	10	Research Computing	2.23
			11	Internet of Things (IoT)	1.95

For each Strategic Priority, we then conducted a gap analysis to identify where we are today in alignment with our state mandates and university goals, where we see ourselves in the future and how we will get there. The next pages show the results of these efforts.

PANDEMIC UPDATE

Thanks to a robust and healthy infrastructure and extensive Continuity of Operations planning, UIT was ready for the COVID-19 pandemic. UIT built from a solid foundation of technology infrastructure, well established purchasing channels with capable vendors, a cooperative relationship with departmental IT staff, and an experienced and dedicated UIT staff to rapidly support the needs of a remote population.

CONTINUITY OF OPERATIONS PLANNING

Long-Range Planning: A Pandemic Example

In 2012, a telephone was a separate desktop appliance. It made calls and took voicemail. A “soft phone” that integrated with the entire network was unimaginable. In a nine-year migration that ultimately led to MS Teams, we evolved to truly unified communications. Formerly separate functions work together: calls, voicemail, instant messages, email, meeting invitations (attend from anywhere using any device), call center support operations. We were ready for the pandemic’s sudden disruption. Faculty and staff became a remote workforce that continued to teach and conduct University business. Students adapted quickly to a new learning experience and medium. A distributed call center workforce helped our Coog community remotely with conventional needs and entirely new ones.

Preparation years in the making. UIT’s Continuity of Operations plan is an all-hazards plan with contingencies for social distancing and remote instruction.

- Blackboard was engineered to support 100% of classes and 100% of students in fully online instruction.
- Classroom Technology was designed to support the use of Zoom and Teams for HyFlex instruction.
- The UH network and Computing Center were optimized to support shifting data traffic.
- Technology of the UH website and mobile application was selected for its ability to deploy content rapidly.
- Purchasing processes allowed for rapid procurement of resources even during pandemic-related shortages.
- Staff were prepared and equipped to work remotely with no reduction in service levels.

IDENTIFYING AND BUILDING SOLUTIONS

Agile, talented and action-oriented IT staff quickly developed solutions to unexpected problems.

- **Assisted with President and Provost town halls (streaming).** The Streaming team rapidly created a system to deliver leadership meetings to a large audience and to facilitate remote and on-premises meetings of the Board of Regents.
- **Upgraded our VPN (secure, Virtual Private Network).** With the sudden increase of faculty, staff and students working and taking classes from home, UIT upgraded the VPN infrastructure from 500 simultaneous connections to 2,500 to allow more people to connect to our campus network at once.
- **Transitioned to a Virtual Environment using MS Teams.** The adoption of MS Teams exploded in 2020, with 67% of faculty, 84% of students and 71% of staff using MS Teams to collaborate in academic and administrative settings.
- **Deployed the Laptop Check-out Program.** UIT developed a contactless laptop checkout program for students with 100 computers contributed by the library and 240 newly purchased laptops. The UH vendor supply network was able to acquire laptops despite a severe international shortage.
- **Deployed UH Go: Coog Strong module.** UIT developed innovative solutions to ease the transition from learning remotely to being back on campus. One example is density mapping that enables the UH community to make proactive, healthy decisions on where to study, relax and eat on campus.
- **Supported Contact Tracing program for internal (Blackboard) and external (Coursera) audiences.** UIT helped the College of Medicine create courses in Blackboard and Coursera, created the registration process, assisted hundreds of students who needed access and produced 27 video segments for Coursera courses. This program gained national accolades for UH as we were one of the first Universities to provide this type of training at the earliest stages of the pandemic.
- **Deployed basic HyFlex classrooms.** UIT coordinated its efforts with departmental IT staff to deploy webcams and microphones to over 200 classrooms to enable basic HyFlex instruction and support students at a distance. Today, 335 classrooms on campus support the use of Zoom or Teams.
- **Created HyFlex classrooms website.** Provided data for over 200 classrooms and created an easy-to-use site for faculty to familiarize themselves with the technology in each.



INFORMATION SECURITY

OVERVIEW

There is a hostile cybersecurity landscape with challenges for all organizations to navigate, as evidenced by the regular media features about cybersecurity threats touching all industries.

With many similarities to small cities, universities face a diverse environment that includes a large variety of services, intellectual and research data and robust, high-speed networks. Maintaining appropriate safeguards within the university ecosystem requires a comprehensive and innovative approach to information protection.

ALIGNMENT

- ▲ **With the University — Competitive Resources:** Secure computing and communication is the foundation that supports a competitive array of essential resources.
- ▲ **With the State — Reliable & Secure Services:** Proper security measures protect the integrity and confidentiality of information.
- ▲ **With Government Mandates:** Position UHS as a leader in cybersecurity by partnering with the Department of Homeland Security (DHS), Texas Department of Information Resources (DIR), FBI Houston Infragard and other federal, state and local agencies.

Program Goals

Develop Roadmap for common/standardized UHS solutions.	Increase engagement of users as strategic information security partners.
Enhance UHS Information Security Incident and Event Management (SIEM) system.	Establish Information Security Liaisons/Officers for all colleges/divisions on each UHS campus.
Focus and enhance information security controls and processes associated with UHS services provided through third-party hosted/cloud services.	Through continued partnerships with the Office of General Counsel, the Division of Research and others, develop a comprehensive System approach to further the discovery mission of the universities through robust data and intellectual property protection including integration into defined compliance and review processes.
Expand 2-factor Authentication deployment (DUO) across all UHS campuses for the protection of additional critical services.	



CURRENT STATE

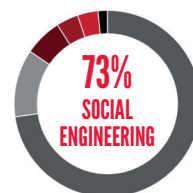
- Centralized Information Security program across all UHS campuses including funding, staffing and initiatives.
- Implemented Multi-Factor Authentication (DUO) for protection of user account credentials and access to university critical resources for all faculty, staff and students on all UHS campuses.
- Implemented additional security controls and technology for messaging services (Proofpoint and Office 365) to protect UHS users from evolving threats received via email including phishing, job scams and executive impersonations.

PATH TO SUCCESS

- Continue UH System-level collaborations. Internal and external collaborations have not only contributed to the program's effectiveness, but have also garnered regional, state and national recognition of UH cybersecurity efforts benefiting academic programs, students, faculty and researchers.
- Continue engaging UH executive leadership, which has been and will remain critical to the success of IT security efforts.

FY2022 INITIATIVES

- Develop roadmap for common/standardized/automated UHS information security solutions.
- Through continued partnerships with the Office of General Counsel, Division of Research and others, develop a comprehensive UHS approach to robust data and intellectual property protection including integration into defined compliance and review processes.
- Enhance UHS information Security Incident and Event Management (SIEM) system.
- Expand the effectiveness of the UHS information Security Program by establishing Information Security Liaisons/Information Security Officers for all colleges/divisions on each UHS campus.
- Expand infrastructure protections to include additional multi-factor authentication protocols and data loss prevention controls.



FY2020 Total Incidents – 228

- Social Engineering - 166
- Physical - 11
- Hacking - 33
- Malware - 2
- Error - 12
- Misuse - 4
- Environmental - 0

SECURITY



“In the evolving landscape of cybersecurity threats, the UH System has positioned itself as a leader in information security program effectiveness, not only with regional, state and federal agencies, but also among our academic peers. We look forward to continuing to raise the bar with our planned cybersecurity initiatives and the support of UHS executive leadership.”

Mary Dickerson
Assistant VC/VP and CISO,
IT Security



CONTINUITY OF OPERATIONS

OVERVIEW

UH must be prepared for timely restoration of critical IT services to support essential functions in the face of an emergency or a service disruption. This means investing in technologies that involve not only the uninterrupted operation of critical systems and services, but also implementing the right set of processes to achieve continued operations.

UIT has processes and procedures in place, outlined in the UIT Continuity of Operations Plan (COOP), to assure service continuity. These include quantifying the business impact of our 11 critical core services and 25 critical information resources, setting a high target of 99.9% service availability for core services, implementing 24 x 7 x 365 monitoring services through the IT Availability Center (ITAC), assigning clear roles and responsibilities for incident management and outlining appropriate communication channels.

ALIGNMENT

- ▲ **With the University — Policy:** The UIT COOP outlines the preparedness, response, assessment, recovery and mitigation of UIT resources. The UIT COOP is consistent with established practices relating to interoperability of emergency response actions, and aligns to the UH Emergency Management Policy MAPP 06.01.01 and UH Continuity of Operations Policy MAPP 06.01.02.
- ▲ **With the State — Continuity of Operations:** The UIT COOP complies with recommendations from the Texas Department of Information Resources (DIR) agency.
- ▲ **With National Entities:** The UIT COOP incorporates the use of the National Incident Management System (NIMS) National Response Framework (NRF), Incident Command (IC) and National Fire Protection Association (NFPA) 1600® Standard on Disaster/Emergency Management and Business Continuity Programs to facilitate interoperability within the university and between responding mutual-aid agencies.

UIT Continuity of Operations Plan (COOP)

11 Critical Core Services

25 Critical Information Resources

UIT Service Availability Dashboard available at <http://www.uh.edu/infotech/about/performance/dashboard/>

CURRENT STATE

- We have consistently met our 99.9% service availability SLA for critical core services and applications such as AccessUH, myUH (PeopleSoft), LMS (Blackboard), Email, Web Farm and Emergency Services.
- UH has mature incident and change management processes to quickly address service affecting incidents and proactively communicate with customers when planned outages will occur.
- Service availability, outages and resolution are communicated to our customers by email and through the UIT Service Dashboard.
- Thanks to UIT continuity planning, all the necessary resources were already in place to make the rapid shift from face-to-face classes to online instruction at the onset of the pandemic.

PATH TO SUCCESS

- Success is measured by achieving our target service level agreements (SLAs) for critical core services and information resources.
- The Continuity of Operations program is expanding to align best practices among the UH System campuses (UH, UH-Clear Lake, UH-Downtown and UH-Victoria).
- Incident management processes and procedures are continually being evaluated to identify areas for improvement.

FY2022 INITIATIVES

- Remain responsive to growing service needs in our critical core services and applications.
- Focus annual UIT COOP exercise on highest risk areas and identify areas for continued improvement.
- Initiate the expansion of the Service Continuity program to include UHCL, UHD and UHV.



FY2021

99.9% service availability for all core services = **Target Met**

CONTINUITY



“IT Services are the critical backbone of a university’s administration, communications, and daily operations. UIT must be prepared to continue operations regardless of the nature of an emergency or the level of impact on our community.”

David Johnson
Assistant Vice President, UH Technology Services and Support



ACADEMIC TECHNOLOGIES

OVERVIEW

During the last few years, the University has been investing in transformative academic technologies, including Active Learning Classrooms (ALC) in support of active learning instruction (ALI), an up-to-date Blackboard platform and upgraded infrastructure in general purpose classrooms. University investments in academic technologies are driven by the continued prioritization of online learning, the proliferation of the use of personal technology among students, and embracing technologies that promote ALI by faculty.

The Provost's Office and academic departments are incubators of innovation in academic technologies. UIT sees its role to be facilitating the adoption of best practices developed by the academic experts. This is accomplished by working with departments to identify key technologies and establishing strategies for campus or systemwide implementation, empowering all academic units to benefit from these technologies and the instructional framework established by their peers.

ALIGNMENT

- ▲ **With the University — National Competitiveness:** UIT, in collaboration with Academic Affairs and UH colleges, has been upgrading and maintaining the technology infrastructure in academic spaces throughout our campus. In addition, UIT continues to partner with colleges to provide technical support to faculty in all general-purpose classrooms.
- ▲ **With the University — Student Success:** UIT is collaborating with Faculty and Departmental Instructional Support (FDIS) to enhance academic spaces and implement ALC to increase student success.

Fall 2020 - 2021



158 General Purpose Classrooms Supported

126 Equipment Requests

335 Total Webcam Distribution/Installations

CURRENT STATE

- Support over 150 UH general purpose classrooms located in 18 buildings. Classroom educational technologies require ongoing maintenance, which includes the projectors, computers, smart podiums, videoconferencing technology and all other technologies utilized in the classroom.
- Basic HyFlex technologies added to over 300 classrooms including all general purpose classrooms.
- Published Audiovisual Design Standards to provide consistent learning spaces throughout the campus.

PATH TO SUCCESS

- Collaborate with academic leaders at the individual, departmental, institutional and system level to identify critical technologies.
- Collaborate with Facilities over the next six to eight years as part of the Classroom Refresh initiative to renovate classrooms with the latest technologies.
- Create 27 advanced HyFlex classrooms that will promote distance learning instruction.

FY2022 INITIATIVES

- Promote new technologies in support of Microsoft Teams and Zoom.
- Engage faculty members and key instructional partners to collaborate and guide the development of new learning spaces.
- Transform general purpose classrooms by implementing technology enhancements.

ACADEMIC



“We continue to enhance the classroom learning environment by effectively integrating technology and flexible furniture to meet the needs of all students.”

Leroy Mays
 Director, Technology Services and Support



NETWORK CONNECTIVITY

OVERVIEW

Faculty, students and staff rely on voice, data and video services to communicate and work on a daily basis. Network connectivity is a core component to any IT service and provides the underlying infrastructure for all voice, data and video.

Supporting the growing demand for ubiquitous Wi-Fi services on campus is paramount. In Fall 2021, over 100,000 unique devices connect to the Wi-Fi network each day. In order to improve this service, there must be continued investment in building a robust infrastructure.

Equally important is the need to continue improving the network connectivity to the world and to our research networks, resulting in faster access to applications and increased productivity.

ALIGNMENT

- ▲ **With the University — Competitive Resources:** UIT works with colleges and divisions to assess their network infrastructure and emerging needs to continuously improve network services, contributing to a mission-critical resource base.
- ▲ **With the University — Student Success:** UIT strives to ensure the students' need for a ubiquitous and reliable Wi-Fi network is consistently met.
- ▲ **With the UH System — Principles 1 and 9:** UIT works with other UHS campuses through the Technology Review program, sharing best practices for design and implementation of wired and Wi-Fi networks. This supports two UHS Principles: the whole is greater than the sum of the parts, and UHS maximizes the benefit to faculty/staff of being within a system (Appendix A).
- ▲ **With the State — Reliable & Secure Services:** UH wired and Wi-Fi networks address the critical Connectivity part of this TX-DIR strategic goal.



100% Aruba

In 2021

6,300+ Wi-Fi Access Points

41,200 average simultaneous devices during peak time

100,000+ unique devices connected per day

\$10M investment in network infrastructure during the last 5 years

\$100,000+ unique devices connected per day



CONNECTIVITY



CURRENT STATE

- Completed a 5-year roadmap to replace Meru Wi-Fi infrastructure with HPE Aruba Networks infrastructure, providing higher reliability and increasing performance by 40%.
- We continue increasing our outdoor Wi-Fi implementations. Some completed in 2021 include the TDECU Stadium, UH Sugar Land and parking lot 8A.
- During the last 2 years, we continued supporting the UH Campus expansion by implementing network services in new buildings such as the Quads, Elgin Garage, University Gateway Garage, UH Katy and UH Sugar Land Technology.
- Sunset the legacy Cisco distribution network infrastructure and upgraded it to 10Gb HPE routers. Upgraded the access network infrastructure supporting Wi-Fi to Gigabit switches.

PATH TO SUCCESS

- Retire aging access network switches supporting security cameras and wired connectivity in academic spaces. Of about 3,500 access switches, 8% are due for upgrade.
- Upgrade network management systems and Wi-Fi monitoring tools to maintain vendor support.
- Reengineer our Wi-Fi network to continue supporting network growth brought by expansion and capital projects (e.g., College of Medicine, Law Center, Core Buildings upgrade and The HUB).

FY2022 INITIATIVES

- Implement the next-generation WLAN Architecture.
- Continue upgrading the inter- and intra-building fiber connectivity across campus buildings to improve performance reliability.
- Through UH System-level collaborations, create UHS Guidelines and Design Standards for IT Facilities in new and legacy buildings, and a program for annual inspections and remediation.
- Reengineer the Security Cameras infrastructure (network and servers) from a distributed architecture to a centralized one.

“Providing ubiquitous and reliable network services in support of our university mission and strategic goals is our core commitment.”

Rita Barrantes

*Ph.D., M.B.A., PMP
Director, Technology Services and Support*



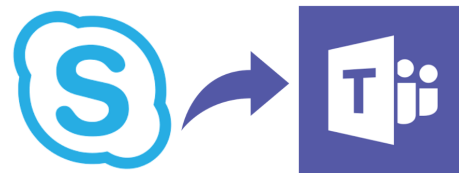
COLLABORATION AND UNIFIED COMMUNICATIONS

OVERVIEW

Users expect communication and the ability to share information and stored data to be seamless, uninterrupted and available wherever they may be. Lines are blurring and even disappearing between services that once were distinct (e.g., PBX, meetings and conferences, customer call centers, email, instant messages, file sharing, collaboration, integration between applications).

ALIGNMENT

- ▲ **With the University — Competitive Resources:** The evolution from conventional telephony to unified communications - Lync to Skype for Business (SFB) and now, to MS Teams - to manage the confluence of communication and information helps maintain a resource base that keeps UH competitive.
- ▲ **With the State — Mobile & Digital Services:** Continuing the growth of a unified communications platform supports the growing reliance on mobile devices to make business communication continuous, robust and portable.



In 2021

5,652,628	Phone Calls
10,605,576	Instant Messages
553,956	Business Meetings Organized
1,529,693	Video Session Minutes



CURRENT STATE

- Deployed MS Teams universitywide for all students, faculty and staff.
- Increased adoption of MS Teams for work team collaboration, allowing sharing of information and simultaneously working on the same documents with added audio, video, instant messaging and whiteboarding.
- Implemented AudioCodes analog gateways and high availability session border controllers.
- Completed function enhancements to the Anywhere365 call center application. We now have 13 Unified Call Centers, compared to 5 in 2019 — 260% growth in the adoption of Anywhere365.
- Collaborating with colleges, divisions and external consultants, we completed a full assessment of MS Teams telephony.

PATH TO SUCCESS

- Integrate end-user collaboration technology. Integration must be an underlying principle in choosing and implementing the tools used for data, connectivity and communication needs.
- Continually assess the future of Unified Communications, including the implementation of cloud PBX and emerging solutions such MS Teams.

FY2022 INITIATIVES

- Implement an operational pilot for MS Teams telephony.
- Enhance cellular coverage on campus using the campus Wi-Fi infrastructure and Passpoint technology.
- Initiate the deployment of high performance 5G cellular networks by implementing a Verizon 5G macrocell at TDECU Stadium.

COMMUNICATIONS



“Unified Communications connects voice, video, meetings, collaboration, files and more — wherever we are, on the device we choose.”

Omar Farooq

Manager, Telecommunications

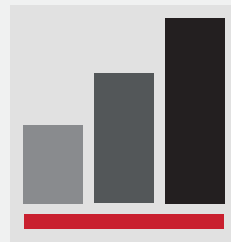
DATA MANAGEMENT AND ANALYTICS

OVERVIEW

Data Management and Analytics services are core components in our efforts to facilitate information-based decision making. The Data Warehouse infrastructure has grown since its inception in 2007 and now holds over 1.6TB of data to provide an efficient data reporting and visualization capabilities for the campus community. On average, there are more than 470 daily visits to UH public and private dashboard websites.

ALIGNMENT

- ▲ **With the University – Community Advancement:** Managing an enormous quantity of data and making it easily accessible to executives and managers keeps UH on track to fulfill the workforce needs of our rapidly growing city and region.
- ▲ **With the University – Student Success:** By presenting concise, clear, up-to-date insights derived from vast underlying data, UIT helps inform critical decisions that boost the ability of our students to successfully complete their educational objectives.
- ▲ **With the State – Data Utility:** Our Data Warehouse and the growing number of dashboards built on it help UHS and UH to succeed in the Data Management & Governance and Data Analytics components of this TX-DIR goal.



472 Over 470 visits per day to the Unified Dashboards platform

1.6 TB Over 1.6TB of data in the University Data Warehouse

CURRENT STATE

- Over 1.6TB of data hosted in the UH Data Warehouse environment.
- Standardized processes for data integration from various sources.
- A Unified Dashboard environment for the efficient and secure display of key performance metrics for the UH community.

PATH TO SUCCESS

- Encourage the business owners to grasp their key performance metrics.
- Sustain standardized data integration processes, presentation tools/templates, security and a unified data visualization environment.

FY2022 INITIATIVES

- Continue supporting the emerging data analytics needs of UH.
- Expand the Unified Dashboard environment to facilitate informed UH operations.

ANALYTICS



“The challenge is to grasp the key metrics to sustain and improve operations”

Haseen Mazhar
Executive Director,
Enterprise Applications

AccessUH Metrics

24,325
Unique Logins
Daily Average

19,729,870
Logins in 2020



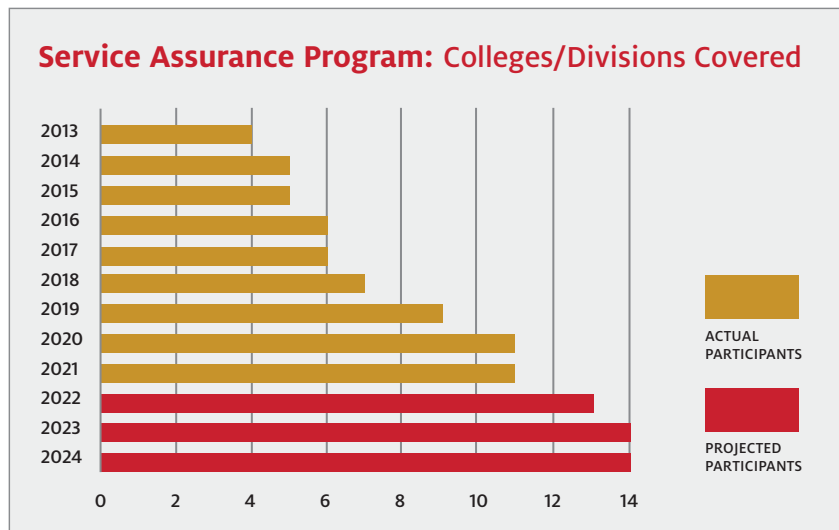
SHARED SERVICES

OVERVIEW

Cost optimization brings colleges, divisions, system universities, and University IT together to leverage Shared Services to meet IT service-level expectations while controlling costs. A collaborative Shared Services solution develops business processes and service level agreements that distribute service delivery between local units and UIT to deliver value to the University and to the UH System.

ALIGNMENT

- ▲ **With the University — Competitive Resources and Student Success:** Actively establishing the optimal combination of locally and centrally provided IT services produces the Competitive Resources essential to assure Student Success.
- ▲ **With the UH System — Principles 1 and 9:** Carefully chosen Shared Services further the 1st and 9th Principles of the UH System: that the whole is greater than the sum of its parts, and that UHS maximizes opportunities for both its faculty and students to benefit from being within a system (Appendix A).
- ▲ **With the State — Mature IT Resources Management:** The Service Assurance program keeps UIT in sync with the business priorities of the community it serves, furthering the Cost Optimization part of this goal.
- ▲ **With the State — Cost-effective & Collaborative Solutions:** As described by TX-DIR, Shared Services allow UHS/UH to focus limited resources on IT applications and supported business functions to yield improved operational efficiency, optimized delivery services, cost savings and harmonized operations.



CURRENT STATE

- Technology Managers TMs in each college and division implement IT policies and work with UIT to create the optimal balance of central and localized services for their units' needs.
- Technology Reviews seek specific ways to improve economy and efficiency in delivering IT services within a college, division or system university. Since the program began in 2010, UIT has reviewed nine colleges, five divisions (or sections of them) and three system universities.
- Completed a comprehensive technology review for the College of Technology.
- Completed annual IT Service Assurance reports for 11 colleges/divisions.

PATH TO SUCCESS

- Increase the breadth of enterprise-level IT technologies implemented as Shared Services both across the campus and systemwide, with particular emphasis on common technology platforms (e.g., PeopleSoft, Blackboard LMS, Exchange email, SharePoint, Microsoft Teams, Office 365 and cloud storage). This will enable the uniform implementation of best practices, greatest economies of scale and lowest total cost of ownership.
- Collaborate systemwide to deliver business value through IT services on additional, key technical activities, such as network standards, enterprise infrastructure planning, IT assessments and best practices, change management, continuity of operations and IT management tools.

FY2022 INITIATIVES

- Conduct Technology Reviews for Bauer College of Business and Hines College of Architecture and Design
- Identify services that benefit most from economies of scale as possible candidates for the Shared Services model.
- Seek opportunities to eliminate redundancy, reduce cost and improve standardization across the UH System.



15 Technology Reviews for UH Colleges/Divisions

3 Technology Reviews for UHS Campuses

SHARED SERVICES



“The cost savings achieved by economies of scale through implementing shared services cannot be overstated.”

Bill Spindler

MBA, CPA
Director, Business Services



MOBILE TECHNOLOGIES: UH GO

OVERVIEW

The University provides an extensive suite of online and technology enabled tools to allow students to access resources, succeed in class, communicate with faculty and staff and conduct business with the University.

UIT has worked with UH Marketing to create a comprehensive mobile app for UH students that consolidates communication, business functions, social and student life activities and academic support into a single mobile platform to improve student life and facilitate student success.

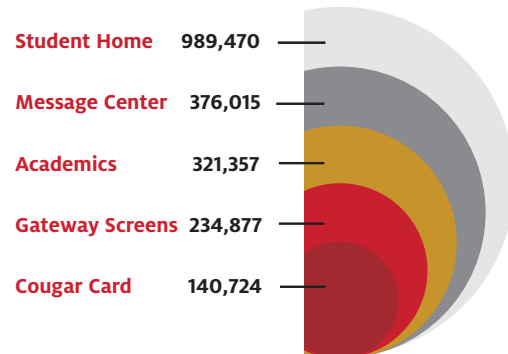
The current generation of students engages with the world through their mobile devices. Creating a comprehensive mobile app for UH students to provide access to critical UH services will improve student success. Given that 96% of students prefer mobile apps to mobile-ready portals, we are integrating AccessUH and 3rd party apps into UH Go, the official mobile app for the University of Houston.

ALIGNMENT

- ▲ **With the University — National Competitiveness:** UIT presented “Transforming Campus Safety with Location Services and Emergency Calling in Your Mobile App” at EDUCAUSE 2021, “Let’s Go Mobile!” and “Engaging Gen Z with a Unified Hybrid Campus App” at the National Association of Campus Card Users (NACCU) 2021 conference. UH Go has won four national awards: best overall app, best use of X-Modules (integration strategy), best use of personalization, and most innovative app for communications.
- ▲ **With the University — Student Success:** Providing students with a single, comprehensive app is an institutional priority. Transitioning core services already available online and through existing apps to the UH Go app is a key part of this effort.
- ▲ **With the State — Mobile & Digital Services:** UH Go helps to create a seamless and consistent user experience across many devices, services and applications.

TOP 5 MOBILE APP SERVICES BY USAGE

Number of Views
September 2020 to September 2021



CURRENT STATE

- To date, 38 services have been integrated into the UH Go mobile app, including myUH, parking, housing, dining, emergency call, emergency notification, Get Involved, calendar and events, catalogs, laundry view, location-based push notifications using Aruba access points in the Student Center and dining halls, single sign-on using Office 365, BlackBoard, Touchnet (Cougar Card), the Parking Guidance System, and a grade center that aggregates grades from myUH, CASA (Courseware) and Blackboard.
- Integrations are in progress for Communicate Directory Services to better target messaging within the app, Navigate, and Cougar Card event access with QR code.
- User experience improvements:
 - Alumni persona and login 6/30/2020.
 - New persona journey 7/27/2020.
 - Upgrading to Modo 4.0. 11/19/2021.
- We enhanced student success by adding the Are You Tech Ready module into new student orientation.

PATH TO SUCCESS

Single sign-on via Office 365 using biometrics is key to the success of the app. Making it easier to log in and use services will keep users coming back. Other efforts to keep Coogs using the app are to:

- Simplify the mobile ecosystem at UH by providing a policy that covers governance, procurement and easy-to-follow steps to get services integrated into the app.
- Provide just-in-time services through UH Go every 6–8 weeks.
- Target meaningful messages to groups and individuals.
- Ensure that UH Go is service-heavy rather than content-heavy.
- Use gamification and user incentives to keep the app installed.

FY2022 INITIATIVES

- Continue to reduce the number of apps at UH. Even though three existing services already available through a third-party app were integrated into UH Go, three new apps were added.
- Increase student engagement by hosting Ideathon, where students compete to build a module of their choice to be included in UH Go.
- Enhance user experience by upgrading our mobile platform.

MOBILE



“Creating a comprehensive mobile app for UH students to provide access to UH services will improve student success.”

Diane Trippel
Director, Web and Communications Services

UH GO MOBILE APP:

- Adoption Rate (downloads)**
- As of August 2018: 8,930
 - As of June 2019: 11,798
 - As of September 2021: 28,513

STUDENT SATISFACTION:

Google Play: 3.8 stars
App Store: 3.5 stars





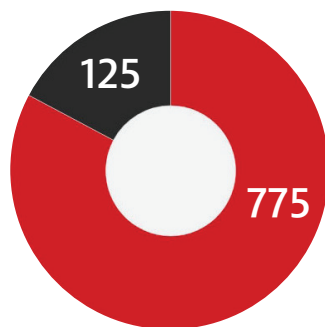
BLENDED DATA CENTER

OVERVIEW

Today's blended data center is a hybrid operation that combines cloud-based and on-premises components. This approach enables the University to implement and enhance services by increasing value, service and productivity while lowering overall costs. On-premises elements provided from the University Data Center maintained by UIT include physical and virtual compute technologies integrated with large, high-speed storage arrays. The cloud-based services may range from Software as a Service (SaaS) to Platform as a Service (PaaS) to Infrastructure as a Service (IaaS), similar to the on-premises UIT virtual technologies (e.g., Microsoft Azure cloud compute and storage resources [IaaS]). Other cloud-based component examples include Microsoft OneDrive (SaaS), Microsoft Outlook/Exchange Online Email (SaaS) and Oracle Cloud Autonomous Database (PaaS).

ALIGNMENT

- ▲ **With the University — Competitive Resources:** Implementing carefully selected resources enables UIT to provide the most current services at optimal cost and value.
- ▲ **With the UH System — Principles 1 and 9:** Carefully chosen cloud services at the system level further the 1st and 9th Principles of the UH System: that the whole is greater than the sum of its parts, and that UHS maximizes opportunities for both its faculty and students to benefit from being within a system (Appendix A).
- ▲ **With the State — Reliable & Secure Services:** A blend of locally provided and cloud services gives flexibility to our strategy to assure security and continuity of operations.
- ▲ **With the State — Mature IT Resource Management:** This approach allows us to choose the optimal combination of service-level value and cost.



Infrastructure

Virtual vs. Physical

- Virtual Servers (86%)
- Physical Servers (14%)

CURRENT STATE

- Higher education, like all industries, is increasingly adopting cloud technologies to replace on-premises service solutions. Many of these cloud solutions take the form of Software as a Service (SaaS) as opposed to merely lifting and shifting compute and storage workloads to hosted data centers.
- UIT has implemented Microsoft 365 SaaS including Exchange Online (email services), OneDrive (user cloud storage), SharePoint (collaborative cloud storage), and Teams (collaborative work space and interactive meeting space).
- Cloud technologies are proliferating, with more options and greater competition among providers.
- In many cases, traditional, on-premises application software marketed to higher education has become a cloud-only offering or at least a cloud version option; e.g., Ad Astra classroom scheduling, Taleo Talent Acquisition and Onboarding. UH business process owners are increasingly considering these SaaS options over traditional on-premises applications.
- The UH cloud in the Data Center has virtualized 83% of the on-premises server infrastructure.

PATH TO SUCCESS

- Lead and advise in the move to the cloud resources where applicable. The rapid expansion of cloud-based services makes it easier and more tempting for individual departments to negotiate directly with vendors of these technologies. UIT can play a key role in helping decision makers find the right fit regarding integrations, seamless interoperability with existing applications and rightsizing the resource needs.
- Maximize consistency and economies of scale. UIT will achieve this by proposing standard criteria and selection processes, helping create cost/value assessments and being a trusted advisor to UH departments.

FY2022 INITIATIVES

- Emphasize strategic rather than transactional vendor relationships.
- Make business process redesign an integral, preliminary step when replacing a technology solution or considering a move to the cloud.
- Promote and lead the definition of a business process redesign strategy that spans functional unit boundaries by engaging multiple units where applicable.

DATA CENTER



“In the expanding world of cloud and on-site technologies relevant to data centers, UIT is partnering with business owners to identify and implement services that increase investment value, customer service and user productivity while lowering overall costs.”

Keith Martin
Assistant VC/VP,
Enterprise Systems



RESEARCH COMPUTING

OVERVIEW

Research demand for High-performance Computing (HPC) is growing rapidly across more academic disciplines, requiring faster computing, ability to manage and transfer ever larger amounts of data quickly and securely and to a broader community, and shorter front-end time from needs request to computing to science acquisition to knowledge dissemination and technology transfer.

ALIGNMENT

- ▲ **With the University — National Competitiveness:** The quality, capability and performance of HPC resources are critical factors in strengthening the status of UH as a nationally competitive public research university.
- ▲ **With the University — Local and National Recognition:** Advanced computing resources help to secure local and national recognition for UH research achievements.
- ▲ **With the UH System — Community Advancement:** HPC plays a key role in enabling rapid progress from research to technology transfer that directly contributes to Community Advancement.
- ▲ **With the State — Data Utility:** The UIT HPC group’s efforts, together with those of the Hewlett Packard Enterprise Data Science Institute (HPE DSI), directly accomplish the Data Analytics component of TX-DIR’s Data Utility strategic goal and can promote the Open Data component of the Data Utility goal.

2,007 Number of TeraFlops Floating Point Operations/Second

432 Number of Researchers Using High Productivity Resources

CURRENT STATE

- The UIT-HPC group provides infrastructure support, system administration and backup for computing, as well as storage equipment, including the clusters at HPE DSI, and other equipment (mostly grant funded) housed in the Research Computing Data Center.
- UIT HPC operates as an honest broker for the campus high performance computing community to advise with architecture and design, assist with procurements and implementations and resolve issues when necessary.

PATH TO SUCCESS

- Continue the UIT-HPC/HPE DSI partnership to propel UH research forward by reducing barriers to entry for new researchers interested in High Performance Computing, especially those in less represented areas like arts/humanities, social sciences and business.
- Improve administrative processes to acquire and use research IT resources. Speed is essential not just in computing and handling data, but also in acquiring and implementing technology.

FY2022 INITIATIVES

- Actively advise on emerging directions, such as massively scalable database architecture, cloud-based HPC and Science DMZ for secure, rapid sharing of large datasets over high-speed WAN.
- Improve HPC training experience by developing and providing introductory short courses to support faster on-ramping for researchers new to using HPC resources.
- Promote awareness and use of HPC by under-represented areas, offering guidance in business processes like funding, and not just the technology.
- Support the continued growth of the Cluster Partnership Program with the HPE DSI to provision resources from start-up funds and grants in a highly efficient and cost-effective manner within the existing public clusters at the University.

RESEARCH



“HPC resources are critical to the University’s research efforts, providing support to customers ranging from Engineering to the Fine Arts.”

Keith Crabb
 Manager, High Performance Computing



INTERNET OF THINGS (IoT)

OVERVIEW

The evolution of the Internet of Things (IoT) continues to confirm its important position in the context of information and communication technologies and the development of higher education. With IoT, institutions can enhance learning outcomes by providing better academic experiences, improving operational efficiency and gaining real-time, actionable insight into student performance.

With the proliferation of smart devices and Wi-Fi connectivity, students are connecting wirelessly using multiple devices such as laptops, tablets, smartphones and wearables. Understanding the potential benefits of IoT technologies and having the ability to implement and manage them effectively are essential to be competitive in higher education. At UH, we intend to use IoT technologies to achieve a smarter, more connected and safer campus. While IoT is still an emerging field, UH already offers innovative solutions using real-time data collection to provide a responsive and personalized student experience.

ALIGNMENT

- ▲ **With the University — National Competitiveness:** UIT supports academic and research initiatives at the Colleges of Engineering, Technology, Pharmacy, and Natural Sciences and Mathematics that require IoT devices such as microscopes, environmental sensors and monitoring cameras.
- ▲ **With the University — Student Success:** UIT and Campus Safety are replacing analog security cameras with digital. Wired and wireless access control is supplanting legacy keys. With Parking and Transportation, UIT is enabling license plate recognition in parking areas, and multiple garages now feature a parking guidance system. In residential halls, students now enjoy technologies like smart TVs, digital signage, voice-recognition digital assistant (e.g., Alexa), Wi-Fi printers and IP-based gaming consoles.
- ▲ **With the University — Athletic Competitiveness:** Recent IoT efforts for Athletics include ticket scanning, iris recognition (biometrics), smart lighting and video in Fertitta Center and POS (point-of-sale) advances.
- ▲ **With the State — Mobile and Digital Services:** As TX-DIR explains, “IoT can provide opportunities for agencies to leverage data to make services smarter, more responsive, and citizen-centric.”



Over 2,500 campus IP security cameras

Over 250 digital signage units on campus

CURRENT STATE

- Over 2,500 IP security cameras including 110 Automatic License Plate Recognition (ALPR) cameras installed on campus and remote locations.
- Completion of the 5-year ALPR roadmap implementation to cover all campus entrances and parking lots.
- Wired and wireless access control solutions installed most recently in new buildings such as Elgin Garage, University Gateway Garage, Science and Quadrangle.
- Over 1,600 Wi-Fi door locks installed in multiple buildings such as the Quadrangle and UH Sugar Land Technology.
- Smart guidance parking system installed in all garages, most recently in the University Gateway Garage.
- Network-enabled microscopes and other specialized equipment used for research purposes.
- Launch of a pilot of Aruba network location-based services at the Student Service Center.

PATH TO SUCCESS

- Continue supporting Campus Safety Systems and the UH Police to sunset the existing 300 analog security cameras and replace them with digital models.
- Continue partnering with the colleges and the Division of Research to support emerging IoT academic and research needs.
- Continue supporting the IoT needs of University Parking and Transportation, Student Housing and Residential Life, Facilities Management and other units as needed.

FY2022 INITIATIVES

- Continue expanding the security camera network to cover bike racks and new buildings such as College of Medicine and Law Center.
- Migrate security camera servers from a distributed architecture to a centralized, enterprise architecture at the UH Data Center.
- Replace analog security cameras with IP cameras.

INTERNET OF THINGS



“Security for IoT is important and UIT continues to review and revise the networks associated with the IoT devices.”

Charles Chambers

Manager, Network Planning and Development

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Thank you to these members of the UH community for their thoughtful contributions to this project. Their effort was essential to define and rank IT strategic priorities that will best advance the University's mission in fiscal years 2020–2024.

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APPENDIX

UNIVERSITY OF HOUSTON SYSTEM PRINCIPLES

Principle 1: The whole of the UH System should be greater than the sum of its parts.

Principle 2: The UH System should provide access to the people of Houston throughout the Houston metropolitan region, making that access as convenient as is academically and financially possible.

Principle 3: The UH System's institutions should be the primary providers of educational access in the Houston metropolitan region. However, they should seek partnerships with other institutions when it benefits students and when it is naturally advantageous.

Principle 4: The UH System should establish some distinctive mission differentiation among its institutions, while still enabling them to serve the needs of their region.

Principle 5: The UH System management structure should be as simple as is possible and should ensure clarity of responsibility and accountability.

Principle 6: The UH System should be strategic about its enrollment growth and intentional about its tuition and other financial strategies.

Principle 7: The UH System should ensure a standard of excellence throughout its institutions, while recognizing differences in student populations and missions.

Principle 8: The UH System should have a clear nomenclature that will enhance international, national, state, and regional marketing and branding.

Principle 9: The UH System should maximize opportunities for both its faculty and students to benefit from being within a system.

UNIVERSITY OF HOUSTON GOALS

National Competitiveness: UH will become a nationally competitive public research university as measured by the Top American Public Research University analysis and/or Carnegie Foundation for the Advancement of Teaching.

Student Success: UH will have a student profile consistent with a nationally competitive public research university by creating an environment in which student success can be ensured.

Community Advancement: UH will commit to fulfilling regional and state workforce needs while becoming the primary engine of social, economic, and intellectual development.

Athletic Competitiveness: UH will provide a comprehensive educational experience to its students and, within this context, it will seek to build the strongest athletic program possible.

Local and National Recognition: UH will be known for its accomplishments locally and nationally.

Competitive Resources: UH will build a resource base that enables it to accomplish its mission and realize its vision.

